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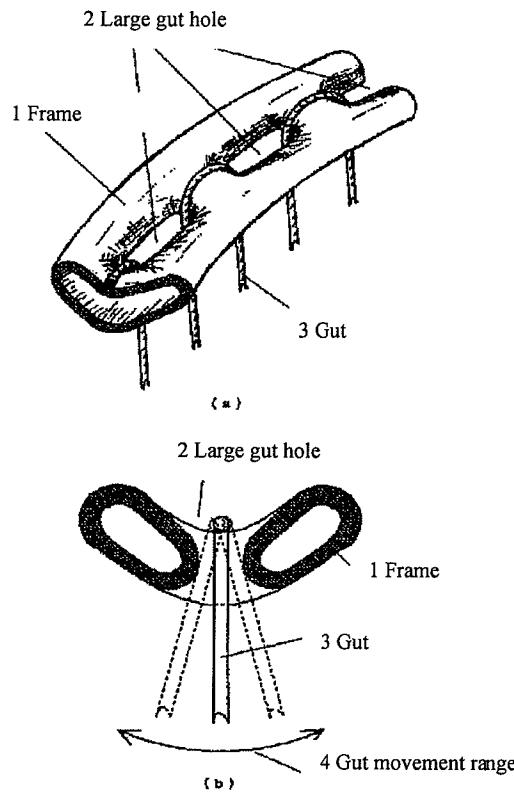
(21) Application number	Japanese Patent Application H5-148199	(71) Applicant	593081833 Mitsuru USUI 3-3-3-208 Shin-hinoodai, Sakai City
(22) Date of application	May 14, 1993	(72) Inventor	Mitsuru USUI 3-3-3-208 Shin-hinoodai, Sakai City

**(54) (TITLE OF THE INVENTION) Racket having very large gut holes**

**(57) (ABSTRACT)**

(OBJECT) The present invention aims at making a racket frame stronger and grommet-less by making gut holes larger, for example, large enough to pass a finger through them, and making the side surfaces of the holes a continuous surface and has the object of simplifying gut stringing, widening the range of gut movement in the proximity of the frame, and improving ball striking performance.

(CONSTITUTION) A single large gut hole is formed by joining neighboring gut holes of the conventional racket, and in place of the opposing gut holes of the conventional racket, reciprocally opposing guts holes are formed by offsetting the gut mesh by one at the opposing positions. The result is the number of gut is reduced to approximately half that of the conventional racket. In addition, the holes constitute a continuous surface consisting of the frame constituting member.



(SCOPE OF PATENT CLAIMS)

(CLAIM 1) Regardless of the shape of a frame, of the method of gut stringing, or of the presence or absence of grommets, the gut hole interval is made larger than the degree to which approximately three gut strings can pass simultaneously even if the size of a gut guide groove is a part of one hole, etc., and the gut hole is formed in various ways.

(CLAIM 2) Based on Claim 1, multiple gut strings are strung simultaneously in the gut guide groove at a single gut hole interval and an optional number of vertical and horizontal gut strings are strung at the same portion.

(CLAIM 3) Gut holes that are exactly the size of the gut mesh are opened at alternately different positions of the same portion of the opposing frame that separates the gut surfaces.

(DETAILED DESCRIPTION OF THE INVENTION)

(0001)

(FIELD OF INDUSTRIAL APPLICATION) The present invention relates to making gut holes as large as possible and reducing the number of gut holes to approximately half that of the prior art, to allowing the frame and the gut holes to be formed simultaneously, to eliminating grommets when stringing gut strings, and to facilitating the stringing work.

(0002)

(PRIOR ART) In the prior art, there is a row of a plurality of gut holes which a diameter that will allow about two gut strings, regardless of thickness, to pass through them arranged in the center of the frame.

(0003) Moreover, in the frame according to the prior art, the shape of their cross-section is mainly limited to that of a pipe. Accordingly, a single gut string passes through the frame through two gut holes, an upper one and a lower one, and then contacts two sharp frame edges. Grommets are essential here to prevent the gut being cut by these frame edges.

(0004)

(PROBLEM(S) TO BE SOLVED BY THE INVENTION) The process in which many thin gut holes are formed is eliminated by forming large gut holes, etc., in a batch.

(0005) The process of gut stringing, which has been difficult because of the thinness of the gut holes, is made easier.

(0006) Because of its thinness, gut is bent at a sharp angle close to 90° at the edges of the gut holes. As a result, long, thin grommets are essential to prevent cutting. Because these now contact the frame in a smooth curve, grommets are eliminated from the frame.

(0007) Moreover, with the conventional pipe frame racket, because of the thinness of the gut holes, the gut holes cannot be formed on a continuous surface as a single tunnel. For this reason, gut tension was received only on the top surface of the frame, and therefore the lower hole simply prevents gut shifting and does not directly receive gut tension. This is changed so that gut holes have a continuous tunnel construction, and tension is received by the entire hole, and thus the thickness of the gut hole

periphery of the frame can be reduced and the thickness of the easily worn down peripheral portion can be increased.

(0008) An object of the present invention is to completely eliminate the aforementioned problems.

(0009)

(MEANS FOR SOLVING THE PROBLEM) In order to attain the aforementioned object, the gut holes have been enlarged dramatically and their shape and arrangement have been devised. There are two methods as follows.

(0010) As shown in Fig. 1, for example, if the gut holes are circular, the diameter of the gut holes is made equal to the gut mesh and they are arranged at gut mesh intervals. If it is a conventional racket, two adjacent gut holes are collectively used as one large gut hole. If the individual gut holes are exactly like doughnut holes, they have an especially smooth curved surface.

(0011) Moreover, as shown in Fig. 2, the gut holes are alternately arranged in the same locations on opposing frames with the gut surfaces separated. This differs from the conventional racket which has the gut holes in pairs in a 1 to 1 correspondence.

(0012)

(OPERATION) As shown in Fig. 1, when gut stringing is conducted, basically two gut strings are passed through one gut hole. If the configuration of the gut suspension portion is changed, the gut strings touch the frame in a smooth curve, and the positions are stabilized by tension such that the adjacent large gut holes are joined by the shortest distance.

(0013)

(EXAMPLES OF EMBODIMENT) Figure 1 is an example of embodiment of a large circular gut hole. The arrangement of gut holes resembles the state of a number of doughnuts lined up.

(0014) Figure 2 is an example of embodiment from which large gut holes are alternately arranged in opposing frames.

(0015)

(EFFECT OF THE INVENTION) First, manufacturing costs can be reduced because the number of gut holes can be reduced approximately half that of the prior art.

(0016) Second, since the diameter of the gut holes is sufficiently large, grommets can be eliminated from the frame as a result of easily forming gut holes as a continuous tunnel.

(0017) Third, gut stringing is extremely easy. In particular, hole threading is easy. Since basically two gut strings pass through one hole, errors in selecting the holes to thread are reduced. Processing of the gut string starting end and ending end is easy, and in some cases, it is possible to replace only one intermediate gut strings.

(0018) Fourth, since the diameter of the gut holes is sufficiently large, their mass can be reduced, and it is possible to attain lighter overall weights by using frames that are not pipes, or with pipe frames, by strengthening the edges of the frame.

(BRIEF DESCRIPTION OF THE DRAWINGS)

(FIGURE 1) This is a schematic diagram of the arrangement of large gut holes and gut stringing.

(FIGURE 2) This is a schematic diagram of the arrangement of large gut holes on opposing frames and gut stringing.

Fig. 1

Fig 1

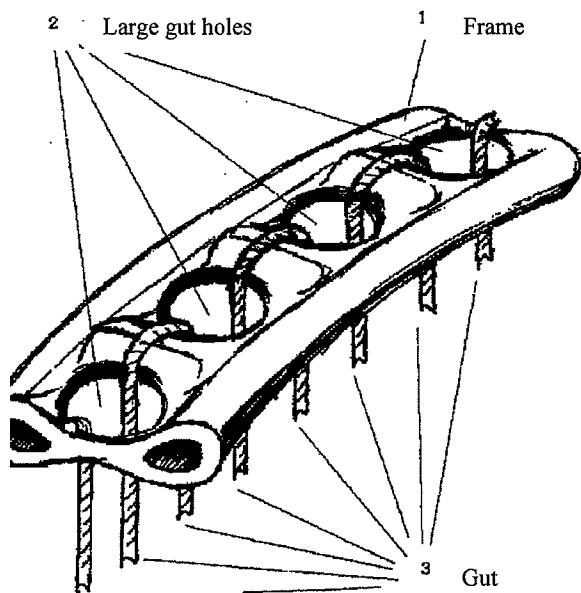
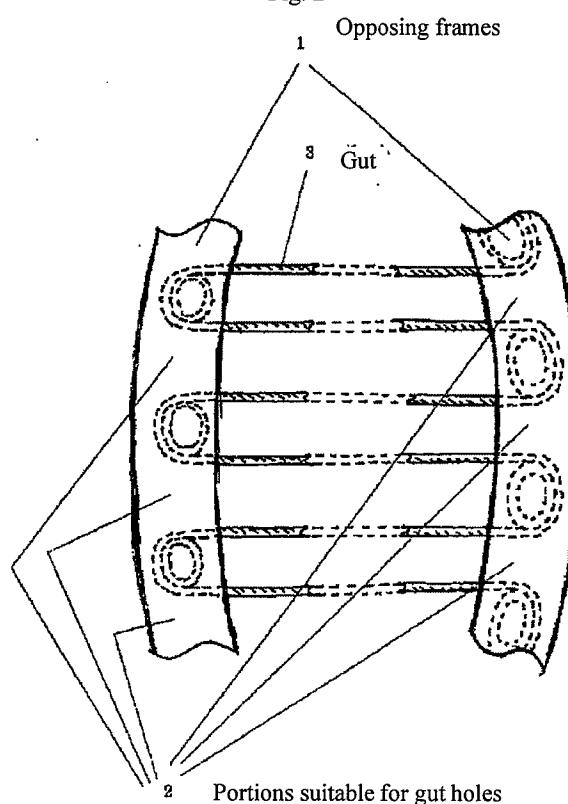


Fig. 2



(WRITTEN AMENDMENT)

(FILING DATE) August 1, 1994

(WRITTEN AMENDMENT 1)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) Claim 1

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(CLAIM 1) A racket wherein the gut hole interval, regardless of the shape of a frame or of the method of gut stringing, is made larger than the degree to which approximately three gut strings can pass simultaneously whether the size of a gut guide groove is one hole or a portion of a guide groove. The diameter of said gut holes or said guide groove of said racket can be changed to a funnel shape and the maximum diameter to twice that of the gut mesh and the minimum diameter to the size of a conventional gut hole.

(WRITTEN AMENDMENT 2)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) Claim 2

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(CLAIM 2) The racket according to Claim 1 that has gut holes wherein the portions of the frame where the gut in said gut holes wraps around said frame comprise a continuous curved surface formed of a frame constituting member. The gut strung on said racket is characterized in that it has no bent portions in the winding portions and is movable without being tightly fixed at one point on the maximum inner circumference of said frame.

(WRITTEN AMENDMENT 3)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) Claim 3

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(CLAIM 3) The racket according to Claims 1 and 2 wherein said gut holes have, in the maximum inner circumference of the frame, a diameter in the longitudinal direction of the frame that is made the exact size of the gut mesh and that has gut holes wherein the gut surfaces are separated and are arranged to be alternately different on the same portions of opposing frames. Said gut holes of said racket are characterized in that they do not have a one-to-one correspondence in the opposing portions as in the prior art and the portions that have gut holes and that are not gut holes on opposing portions have a one-to-one correspondence.

(WRITTEN AMENDMENT 4)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) 0010

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(0010) As shown in Fig. 1, for example, if the gut holes are close to elliptical, the major axis of the gut holes in the maximum inner circumference portion of the frame is made equal to the gut mesh and they are arranged at gut mesh intervals. If it is a conventional racket, two adjacent gut

holes are collectively used as one large gut hole. As shown in Fig. 1 (b), the individual gut holes have a smooth saddle shape in the gut wrapping portion, particularly on the upper surface, and the gut is stabilized at the lowest position of the saddle by tension.

(WRITTEN AMENDMENT 5)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) 0013

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(0013)

(EXAMPLE OF EMBODIMENT) Figure 1 is an example of embodiment of a large elliptical gut hole.

(WRITTEN AMENDMENT 6)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) 0015

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(0015)

(EFFECT OF THE INVENTION) First, manufacturing costs can be reduced because the number of gut holes can be reduced approximately half that of the prior art and a gut hole punching stage is unneeded in the case of integrated formation.

(WRITTEN AMENDMENT 7)

(DOCUMENT TO BE AMENDED) Description

(ITEM(S) TO BE AMENDED) 0016

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

(0016) Second, gut-protecting grommets are unneeded because there are no bent portions in the gut winding part. In addition, as shown in Fig. 1 (b), the movement range of the gut is large, and when a ball is hit close to the frame, the gut response is flexible, gut cutting is prevented, and hitting performance is improved.

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(WRITTEN AMENDMENT)

(FILING DATE) August 1, 1994

(WRITTEN AMENDMENT 1)

(DOCUMENT TO BE AMENDED) Drawings

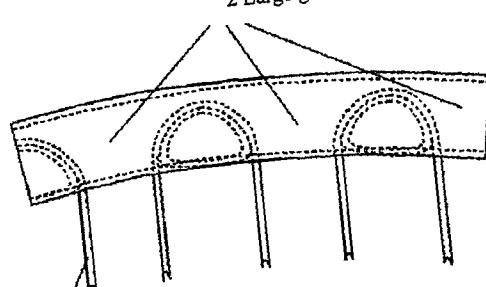
(ITEM(S) TO BE AMENDED) Complete drawings

(METHOD OF AMENDMENT) Modification

(PROPOSED AMENDMENT)

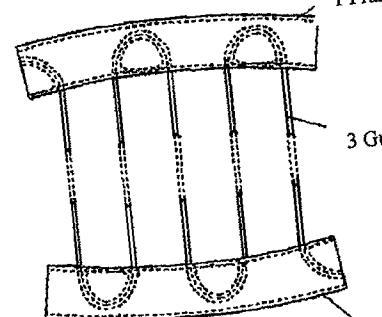
Fig.2

2 Large gut hole



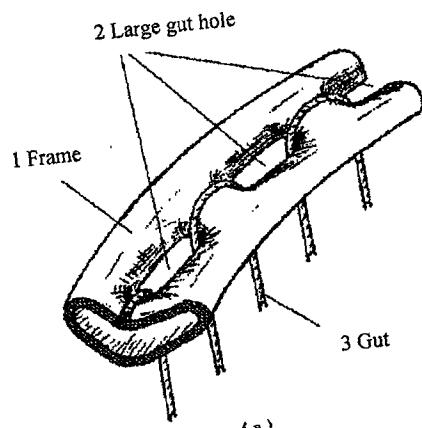
(a)

1 Frame

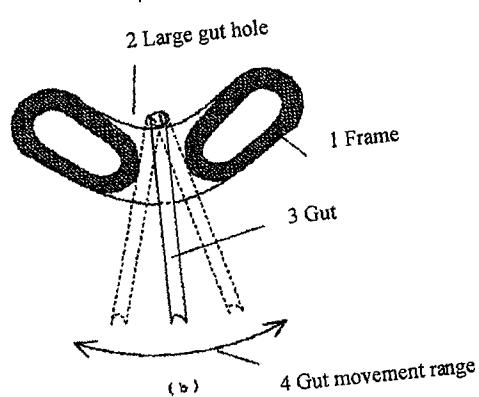


(b)

Fig.1



(a)



(b)